Computer Project

Undergraduate (1st Year) EPITA

Skraa Party

Authors:
Maxime Lizandier
Gaétan Diawara

Project Manager:
Yann Nitzpon


SKRAA
PROD

Tuesday 13, March

Table of contents

Contents

Book of specifications

1 Introduction

We are Skraa Production, and we are working on our game named *Skraa Party*, which is coming out in 2018 ! It has been 9 years since *Left 4 Dead 2* came out, and this game is the inspiration and the base of our project, mixing cooperation and first person shooter, two features loved by our group.

Skraa Party will take place in "*Skraa Land*", an abandoned and cursed park. Our protagonists will be a group of young people, doing urbex, and trying to find a nice place to drink booze and listen to loud music. What they ignore is that they are going to fight to death against a huge number of zombies. This is where the first person shooter dimension takes place in the game, in order to survive these young persons have to kill the evil monsters with fire weapons, with the players controlling one of the heroes.

The cooperative dimension of this game is that players will have to work together in order to escape. Zombies will never stop coming, their number will become bigger over time. The goal of this game is to escape from this hell, in order to do so, players will have to find hidden objects all over the map. These objects will either help them fight the enemy, or help them repairing a car which is their only way out.

Every character will have a specific advantage over the other characters, for example one will have more health than the other, a second one will be faster, one will jump higher... But they will also have some disadvantage, if the character has more health he will be heavier and slower, if he is faster he will carry less weapons and objects, if he can jump higher he will have less health and so forth.

Zombies characters will be taken from the Unity Asset Store, guns models, and the players characters will certainly be taken from there too. The map will be a park, as stated above, and created by our group, with several points where players can take cover. Various buildings will be on the map too, for example a house, a fountain, and a lake with a fisher house. The map and the building design will be with Unity3D (2017.3 version) and Blender.

In this book of specifications, there will be numerous parts. First we will introduce ourselves and then there will be the origin and type of the project explaining how we found our game idea, and what it will consist of. After this we can found the part object of study stating the experience this project could possibly give us. Next there will be the state of the art, in this part it is mentioned what our inspirations were, and some innovation for our game. The part which is right after is the material and intellectual resources part, stating what will be the material, the software and the tools used. Then comes the operational part where we specify the time, and money we will put for this game. After this, there is parts of the project, it is the distribution of tasks in our group, and then the progression through the different presentation of these tasks. To finish there is the conclusion.

2 Individual presentation

2.1 Yann Nitzpon

After taking the decision to pursue the scientific path of baccalauréat and immediately chose the « Science of engineering » option for which I had a lot more interest than for the « Biology » option, I had to choose which tasks I wanted to accomplish for the the « TPE project ».
This project consisted in a robot equipped with a camera that could transmit a live feed (of the video it took) through an application that I entirely designed and that also could pilot the robot thanks to wi-fi. Being already really interested in programming, I convinced my group to let me make the application, and so I started to learn about some aspect of application creation on the Android platform.
For my senior year project, I also managed the creation of the application, but this time the application enabled the user to control a massaging jacket. During those two years, I deepened my knowledge in programming, that rapidly became a passion. I'm really interested in the learning of programming languages and other aspects of programming, and I'm convinced that this video-game project will help me in this way. I will be able to expand my knowledge in C# and I will use the software Unity for the fist time in order to create a video-game.

2.2 Gaétan Diawara

I am Gaétan Diawara, I am 18. I am an engineer Wannabe. It is not my first project of programming, I already coded in python, C++, C#, Java et Visual Basics either for my own pleasure or for school. The back stories come for most of them from my head. I've always wanted to code something that I will be judged for (I was for the BAC but It was pretty easy, so I don't consider it).

"Why do I never test my code? Because if I do I would be doubting my skills" Gaétan Diawara

2.3 Maxime Lizandier

Last year I was in a S-SVT class, where I followed the specialty ISN. During this class I learned the Java language, and I also had to realize a group project. It was the first time I ever coded, and I instantly knew I would love this class. And I did. The problems faced when programing always makes me want to know more and more. I believe that the team work is essential and I will never let my group down, I know that I can trust them and I hope it is reciprocal. This game project will bring me plenty of experience for the future and I'm looking forward to work with these people. I consider myself as curious and kind of artistic, I am sure that it can bring a lot to this group.

3 Origin and type of the project

To come up with this idea, we did a "brainstorming", we sat together and just said every idea we had out loud. We first had the idea of combining three or four mini-games in order to create a sort of competition, and one of these mini-games was kind of a zombie survival game. But as we had more and more ideas for this mini-game, the idea was to privilege the quality over the quantity, but at the end we just thought: "You know what, let's only make this game". And then we created the whole story behind this game.
For this game, we wanted to exploit a gloomy environment, and make sure that the player would feel the reigning atmosphere. To make it more realistic, and create an immersive experience, we decided that the player would be in first person. Therefore, this game is an FPS shooter.

4 Object of study

The primary purpose of this game making is to learn how to program in C# and how to use an object oriented programming language. It would bring us a lot of knowledge and sharpen our skills int the matter. But we also wanted to combine the useful to the pleasure, we think that this project could bring us a lot of fun too, and of course besten our teamwork appreciation.

5 State of the art

The game that would look the most like ours should be "Left 4 dead 2" it is a zombie game, where the goal is to complete all the levels in cooperation with your friends, and survive the zombie apocalypse. The enemies have various strengths and weaknesses that the players can exploit.
And some other games that could look alike this one are "Call of Duty: Zombie" that provides a pure shooting experience, "Friday the 13th" that encourages and enacts cooperation between players in order to escape from death. Finally, "Dead Rising" could also make people think about our game thanks to the massive slaughter of zombies.
Of course, we would innovate, by mixing-up some of these games features, but also by adding some personal touches.

6 Material and intellectual resources

The material we will be using will be our computers, our screens, our mouses and keyboards.

We will be using Adobe Photoshop in order to do arts such as the HUD elements, the main menu buttons, the game jacket and so forth. Blender will be used to create some elements needed to the map, such as a gate located at the entrance of the park and the fisher house. We will be using the game engine Unity in order to code the game. We will also use Adobe After Effects to make a trailer of the game.

7 Operational

This project will be a major part of our 2nd semester. We will put at least 5 hours or more of our time in this project per week. The cost will be estimated at 150 €, for possible t-shirts, the domain name, and fast food after all the hard work accomplished.

8 Parts of the project

8.1 Distribution of tasks

Tasks	**Maxime**	**Yann**	**Gaétan**
Menus & interface	**P**	-	S
Map design	**P**	-	S
3D element creation	S	-	**P**
HUD	-	S	**P**
Game scenario & story	S	**P**	-
Gameplay & pathing	-	**P**	S
Visual effects	-	S	**P**
Sound design	-	S	**P**
Website	**P**	S	-
Online mode	S	-	**P**
Service Provider (Network, domain name)	**P**	S	-
AI	-	**P**	S

P : Principal
S : Substitute

9 Progression

Tasks	**1st Presentation**	**2nd Presentation**	**Final Presentation**
Menus creation	30 %	75 %	100 %
Map design	30 %	60 %	100 %
3D element creation	10 %	40 %	100 %
HUD	20 %	50 %	100 %
Game scenario & story	30 %	75 %	100 %
Gameplay & pathing	30 %	75 %	100 %
Visual effects	20 %	50 %	100 %
Sound design	30 &	75 %	100 %
Website	30 %	60 %	100 %
Online mode	20 %	50 %	100 %
Service Provider (Network, domain name)	75 %	100 %	100 %
AI	20 %	50 %	100 %

Menus & interface: This is the environment in which the user can access the main menu, the different game modes, and the settings. This part also includes the in-game pause menu.

Map design: It consists in creating the map (the environment in which the user will play and move his character) and the decoration elements like a house, a fountain, and many other elements.

3D element creation: In order to survive, the player will need some ammunitions and heal packages (along with others bonuses), he will find them spread across the map. These will be created in this part.

HUD: It represents the different elements that are displayed on the screen, like character's health and it's inventory.

Game scenario & story: This part answers to all the question's behind the characters, who are they ? where do they come from ? what was their lives before this nightmare ? But this also means how should the characters look like ? what are their perks ?
If the project was a movie, this would be the director's job.

Gameplay & pathing: In this part, the goal is to decide how the characters should interact in the environment, the map and the objects in it; but also to what extent the player should decide to move his character across the map in order to avoid the mass of zombies and successfully survive.

Visual effects: Visual effects are the different element changing the player's sight, like some particles, and a bit of fog here and there.

Sound design: These are every sound and/or noise the player is hearing, from the characters to the weapons, when moving or not, some element in the map might also make noises, like grass and doors.

Website: On the website, there will be access to the project presentation with a lot of information concerning it, it will also enable visitors to see the members of the game community and every elements we used to create the game, like sounds, applets and the software we used, of course it will be possible to download the report and the project including a light version.

Online mode: What is depicted as being the online mode is actually the multiplayer game mode, so that two to four people can play together, in cooperation. the gameplay will more or less be the same, of course a little change of story will apply, along with the difficulty and the number of element present on the map.

Service provider: The choice was made to make this an entire task so that we will not end up having problems with it, basically it concerns the reservation of the website's domain name and the renting or buying of means to run the server we will use to host the multiplayer games and other elements if necessary.

AI: Standing for « Artificial Intelligence », the AI task will consist into programming the zombies to attack the characters in a certain manner, and with the right timing in order to be consistant with the story and the pathing we explained above.

10 Conclusion

Thus we are only at the dawn of our project but we are really confident. It is going to be a great experience, and we are excited about the future development of *Skraa Party*, our survival-horror game based on cooperation.

Mixing ideas from similar games, we had to find unique features to not realize a pale copy of our inspirations. We decided to add a unique gameplay to each characters the players will choose. Furthermore we decided to create our own map design, where we will put our own ideas in order to create perfect horror level. If we don't fall behind our schedule, we are confident that this game can be really good.

Computer Project

Undergraduate (1st Year) EPITA

Report for the 1st Presentation

Skraa Party

Authors:
Maxime Lizandier
Gaétan Diawara

Project Manager:
Yann Nitzpon

11 Introduction

At the beginning we found the idea of the game with our previous group member. We began to do some research in order to create the map, found the textures we wanted and downloaded the assets. Little by little it became better and better.
By the time we reached February, we knew that we would only be two for the continuation of the project. Once we partnered up with Gaétan, we really went on with the project. We added the main elements of the map so that it was ready for the fist presentation, and then came the big research part, we almost had to look up everything we wanted to do on the Internet. From video tutorials on YouTube to some unknown forums, this really is what took most of our time. This is the reason why we decided to do our researches and do some work (make the menus, find some assets and write some scripts) on our own time and then meet together to regroup our work and assemble all the scripts (which also took quiet some time).

12 Precise advancement

12.1 The menus - Maxime

The first piece we see in the game is the menu. In the first one, we have the possibility to choose to play, to exit the game, or to go through the settings (which currently only contains the volume of the game). By clicking the play button, you can then choose to play in the mode you want (Singleplayer or multiplayer) or to go back to the main menu.

12.2 Building of the map - Maxime and Gaétan

The map was made in different steps, we used Unity tools and some asset's textures to purely build the ground and shape bumps and hollows in it. Then we added trees and bushes to make it a little more living, and after that we added a wooden bridge above a little lake to make the map more stylistic and practical. At this point the basic ground of the map was set.
In order to keep in touch with our story, we added a little hut, in which the player could restore his life and get more weapons and ammunitions. We also added some decoration elements to add a gloomy atmosphere.
Finally we made it night, also for the atmosphere aspect.

12.3 The different scripts

Once we added the first person camera to the character which we found in an asset, we « gave him a weapon » in order to begin with the different scripts we would need.
Our first script concerned the firing of bullets and the management of ammunition we could see in the HUD. Then came the big part.

12.4 Artificial Intelligence - Yann

How to make an Artificial Intelligence ?
This really was one of the most difficult part along with the multilayer experience. Therefore We had to watch a lot of tutorials in order to understand the basic notions behind the functioning of the AI. Nevertheless we succeeded in understanding it after some time. Accompanied with this knowledge, we eventually had a walking zombie that could chase the player across the field through the shortest path possible.

12.5 HUD - Gaétan

We quiet knew how this part would work, we already had created the variables for the ammunition management, now all we had to do was to implement a canvas using these variables. It was not « easy » , but it really was easier than the other parts.

12.6 Singleplayer - Maxime et Gaétan

When you click on the Singleplayer button, you directly spawn near the « safe house » , and the Zombie waves begin, one after the other, becoming more and more difficult.

12.7 Multilayer mode - Maxime et Gaétan

The first step for playing in the multiplayer mode is the selection of the character you want to play with. After that you spawn on the map just like in the singleplayer mode. The main difference with the singleplayer mode will be in the wave system, of course there will be more zombies in the multiplayer mode so that every player will have « something to play with » .

13 Description of achievements

13.1 Our joys

First of all, we must say that we are really happy to encounter the concrete creation of an actual video-game, we are (almost) making all the choices, about the story, how it works, the map, the gameplay, we are controlling what happens, when and where it happens.
Another good point is that we realized that the aesthetics was really better than what we imagined, the textures were actually of quiet good quality even for free.

13.2 Our sadness

One disturbing point for us was that 80 % of the time, we are searching for answers and not actually coding.
And when you have a problem with a function you want to implement, you are left alone in the darkness of the internet's deepness, although this can be a good point for some people because it is forcing you to be autonomous. The applies for the constraints concerning the maximum capacity of the Unity cloud project or the GitHub maximum data upload limit, you just have to find your way.

Finally, one thing we also found sad was every problem caused by animations (mainly the clipping in the ground).

14 What still needs to be done

14.1 Artificial Intelligence

One problem remained, How to make the zombie avoid obstacles such as trees and buildings ? After another load of research and tutorials, we found an good enough working method (which was actually already implemented in Unity) which consisted in building a map in which we define the areas where the zombie could walk. This method needs to be implemented.

14.2 Story and gameplay

The system of waves needs to be implemented along with the side story (Bonus) in which the players need to repair a car in order to escape (car parts would be to find on the map).
We also will have to add the other characters in the game. And we could add more weapons, maybe even a grenade.

14.3 Visual effects

Some visual effects could also be added, like projection of fire coming out of the barrel of the weapon for example, or even bullet impacts on buildings.

14.4 Visual effects

We currently have the shooting sound of the weapon, but we could add a little background music, a walking and attacking sound, also a reloading sound and more.

15 Appendices

15.1 Scripts

Player.cs

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Player : MonoBehaviour {

    public enum PlayerType
    {
        Sniper,
        Heavy,
        Scout
    };

    //Public attributes :
    public int BaseHealth = 100;
    public int TotalAmmo;

    //Private attributes :
    private int PlayersHealth;
    private string Name;
    private int Speed;
    private int Jump;

    //Constructor :
    public Player(string name, int speed, PlayerType playertype)
    {
        this.Name = name;
        this.Speed = speed;
    }

    // Use this for initialization
    void Start () {

        PlayersHealth = BaseHealth;



    }

    // Update is called once per frame
    void Update () {

    }

```

Script : Players

Weapons.cs

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Weapons : MonoBehaviour
{

    public enum Weapon
    {
        AK47,
        Scorpio,
        M4A1,
        M4A1S,
        UMP45,
        Grenade
    };

    private Weapon weapon;
    private string Name;
    private int MagazineCapacity;
    private int Damage;

    public Weapons(string name, int damage, int magazineCapacity, Weapon weapon)
    {
        this.Name = name;
        this.Damage = damage;
        this.MagazineCapacity = magazineCapacity;
        this.weapon = weapon;
    }

    // Use this for initialization
    void Start () {

    }

    // Update is called once per frame
    void Update () {

    }
}

```

Script : Weapons

ZombieAI.cs

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class EnnemyAI: MonoBehaviour
{
    public enum ZombieType
    {
        Light1,
        Medium1,
        Heavy1,
        Light2,
        Medium2,
        Heavy2,
        Light3,
        Medium3,
        Heavy3
    };

    private float Distance;
    private Transform Target;
    private float LookingRange;
    private float ChasingRange;
    private float AttackingRange;
    private float Speed;
    private float AttackLoadingTime;
    private float AttackingTime;
    private int Damage;
    private int Life = 100;
    private CharacterController Controller;
    private Vector3 MovingDirection = Vector3.zero;

    public float Gravity = 20f;

    Animator attack;
    Animator walk;

    // Use this for initialization
    void Start ()
    {
        AttackingTime = (int)Time.time;

        attack = (Animator)GetComponent<Animator> ();
        walk = (Animator)GetComponent<Animator> ();

    }
```

Script : ZombieAI - part 1

ZombieAI.cs

```
47
48          // Update is called once per frame
49          void Update ()
50          {
51              Distance = Vector3.Distance(Target.position, transform.position);
52
53              if (Distance < LookingRange)
54              {
55                  Look();
56              }
57
58              if (Distance < AttackingRange)
59              {
60                  Attack(attack);
61              }
62              else if (Distance < ChasingRange || Life < 100)
63              {
64                  Chase(walk);
65              }
66          }
```

Script : ZombieAI - part 2

```
67
68          private void Look()
69          {
70              var rotation = Quaternion.LookRotation(Target.position - transform.position);
71              transform.rotation = Quaternion.Slerp(transform.rotation, rotation, Time.deltaTime);
72          }
73
74          private void Chase(Animator anim)
75          {
76              //GetComponent.<Animator>().Play("walk");
77              anim.SetInteger("walk", 1);
78
79              MovingDirection = transform.forward;
80              MovingDirection = MovingDirection * Speed;
81              //MovingDirection.y = MovingDirection.y - (Gravity * Time.deltaTime);
82              Controller.Move(MovingDirection * Time.deltaTime);
83          }
84
85          private void Attack(Animator anim)
86          {
87              if (Time.time > AttackingTime)
88              {
89                  //GetComponent.<Animator>().Play("attack");
90                  anim.SetInteger("attack", 1);
91              }
92
93              AttackingTime = (int)Time.time + AttackLoadingTime;
94          }
95      }
96
```

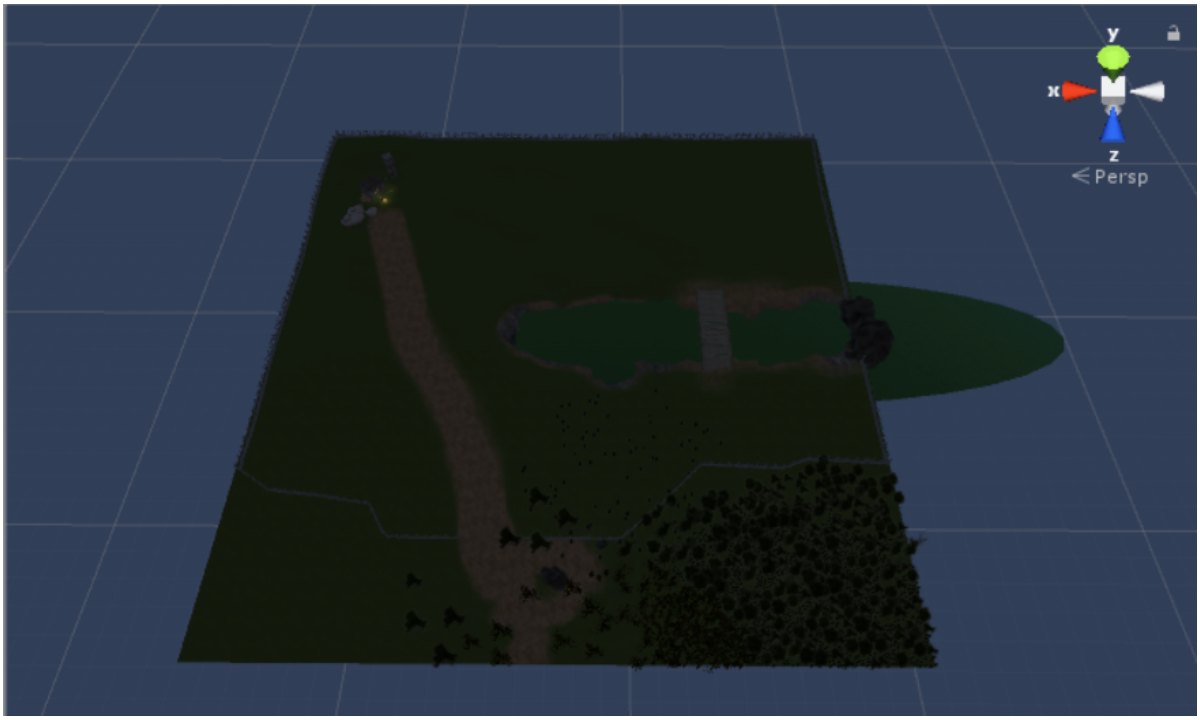
Script : ZombieAI - part 3

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.Networking;
using UnityEngine.SceneManagement;

public class Pause : MonoBehaviour
{

    public static bool GamePaused = false;
    public GameObject pauseMenuUI;

    // Update is called once per frame
    void Update () {
        if (Input.GetKeyDown(KeyCode.Escape))
        {
            if (GamePaused)
            {
                Resume();
            }
            else
            {
                PauseIt();
            }
        }
    }

    public void Resume()
    {
        pauseMenuUI.SetActive(false);

        GamePaused = false;
    }

    void PauseIt()
    {
        pauseMenuUI.SetActive(true);

        GamePaused = true;
    }

    public void LoadMenu()
    {
        Debug.Log("Loading main menu...");
        Network.Disconnect();
        MasterServer.UnregisterHost();
        SceneManager.LoadScene(SceneManager.GetActiveScene().buildIndex -2);
    }

    public void QuitGame()
    {
        Debug.Log("Quitting game...");
        Network.Disconnect();
        MasterServer.UnregisterHost();
        Application.Quit();
    }
}
```

Script : Pause menu

15.2 Screenshots

Screenshot : Campfire - Spawn point



Screenshot : Map - Aerial point of view

16 Conclusion

Thus despite some problems in our group (losing two member and having a new one), along with some programming problems due to the discovery of Unity, we had a good time making the project for this first presentation.// Building the map, making the gameplay and the AI were few challenges that we overcame, for this first presentation and we are looking forward to facing new challenges.// For the next presentation we will improve the AI, the animations, the gameplay as well as the sound design, or the website.